CLAIMS

1. A method for aligning an optical element of an optical interferometer in which a beam of light interacts with the optical element and the optical element is tilted about first and second axes to adjust the relative phase of components of the beam, wherein at least three alignment beams of monochromatic light are directed through the interferometer towards respective detectors, the detectors being arranged in pairs such that tilting the optical element about the first axis affects the relative phase of components of each of the beams directed towards a first pair of detectors in a predetermined manner and tilting the optical element about the second axis affects the relative phase of components of each of the beams directed towards the second pair of detectors in a predetermined manner, a first estimate of an aligned optical element position is derived by determining from an output of at least one detector a first element position at which the magnitude of the beam incident on that detector is a maximum, second estimates of aligned element positions are derived by determining second element positions at which predetermined phase differences between beams incident on each of the pairs of detectors are established, and the element is aligned by moving it to a final position which is one of the second positions which is at or adjacent the first position.

2. A method according to claim 1, wherein the first and second axes are orthogonal.

3. A method according to claim 1 or 2, wherein the beams are parallel.

4. A method according to claim 1, 2 or 3, wherein the detectors are arranged such that tilting the optical element about the first axis does not affect the relative phase of components of each of the beams directed towards a first pair of the detectors and tilting the optical element about the second axis does not affect the relative phase of components of each of the beams directed towards the second pair of detectors, the second estimates of aligned element positions being derived by determining second

element positions at which the phase differences between beams instant on each of the pairs of detectors are a minimum.

5. A method according to any preceding claim, wherein the said first element position is derived by calculating element positions from the outputs of each of the detectors such that each calculated element position corresponds to the position at which the magnitude of the beam incident on the respective detector is a maximum, and determining the first element position by combining the calculated element positions.

6. A method according to any preceding claim, comprising three detectors, one detector being included in each of the first and second pairs of detectors.

7. A method according to claim 6, wherein four detectors are provided.

8. A method according to any preceding claim, wherein a set of second element positions is determined, and the element is aligned by moving it to the second position which is closest to the first element position.

9. A method according to any one of claims 1 to 7, wherein a set of second element positions is determined, and the element is moved to each of the set of second element positions in turn, the magnitude of an output of at least one of the detectors is monitored at each position, and the element is moved to the second element position at which the monitored magnitude is a maximum.

10. A method according to any preceding claim, wherein the optical element is a mirror.

11. A method according to any preceding claim, wherein the optical element is tilted by a plurality of actuators each of which is aligned with a respective detector.

12. An apparatus for aligning an optical element of an optical interferometer in which a beam of light interacts with the optical element and the optical element is tilted about first and second axes to adjust the relative phases of components of the beam, comprising means for directing at least three alignment beams of monochromatic light through the interferometer towards respective detectors, the detectors being arranged in pairs such that tilting the optical element about the first axis affects the relative phase of components of each of the beams directed towards a first pair of detectors in a predetermined manner and tilting the optical element about the second axis affects the relative phase of components of each of the beams directed towards a second pair of detectors in a predetermined manner, means for deriving a first estimate of an aligned optical element position by determining from an output of at least one detector a first element position at which the magnitude of the beam incident on that detector is a maximum, means for deriving second estimates of aligned element positions by determining second element positions at which predetermined phase differences between beams incident on each of the pairs of detectors are established, and means for aligning the element by moving it to a final position which is one of the second positions which is at or adjacent the first position.

13. An apparatus according to claim 12, wherein the first and second axes are orthogonal.

14. An apparatus according to claim 12 or 13, wherein the beams are parallel.

15. An apparatus according to claim 12, 13 or 14, wherein the detectors are arranged such that tilting the optical element about the first axis does not affect the relative phase of components of each of the beams directed towards a first pair of the detectors and tilting the optical element about the second axis does not affect the relative phase of components of each of the beams directed towards the second pair of detectors, means being provided to derive the second estimates of aligned element positions by determining second element positions at which the phase differences between beams incident on each of the pairs of detectors are a minimum.

16. An apparatus according to any one of claims 12 to 15, wherein the optical element is a tiltable mirror.

17. An apparatus according to claim 16, wherein a further mirror is positioned adjacent to and at an angle to the tiltable mirror and a beam splitter is positioned between the mirrors such that components of the beams are transmitted through the beam splitter, reflected by one of the mirrors, and reflected again by the beam splitter to the detectors, and components of the beams are reflected by the beam splitter, reflected by the other mirror, and transmitted through the beam splitter to the detector.

18. An apparatus according to claim 17, wherein the mirrors are orthogonal.

19. An apparatus according to any one of claims 12 to 18, wherein the optical element is mounted on actuators each of which is aligned with a respective detector.

20. An apparatus according to any one of claims 12 to 19, comprising means for calculating element positions from the outputs of each of the detectors such that each calculated element position corresponds to the position at which the magnitude of the beam incident on the respective detector is a maximum, and means for determining the first element position by combining the calculated element positions.

21. An apparatus according to any one of claims 12 to 20, comprising three detectors are provided, one detector being included in each of the first and second pairs of detectors.

22. An apparatus according to any claim 21, wherein four detectors are provided.

23. An apparatus according to any one of claims 12 to 22, comprising means for determining a set of second element positions, and means for moving the element to the second position which is closest to the first element position.

24. An apparatus according to any one of claims 12 to 22, comprising means for determining a set of second element positions, and means for moving the element to each of the set of second element positions in turn, means for monitoring the magnitude of an output of at least one of the detectors at each position, and means for moving the element to the second element position at which the monitored magnitude is a maximum.

25. A method for aligning an optical element of an optical interferometer substantially as hereinbefore described with reference to the accompanying drawings.

26. An apparatus for aligning an optical element of an optical interferometer substantially as hereinbefore described with reference to the accompanying drawings.